

Jun 11th, 10:20 AM - 10:40 AM

Ozaukee Fish Passage Program - Making Connections Across Our Watersheds: Active restoration of riparian migratory corridors in the Lake Michigan Basin in Ozaukee County

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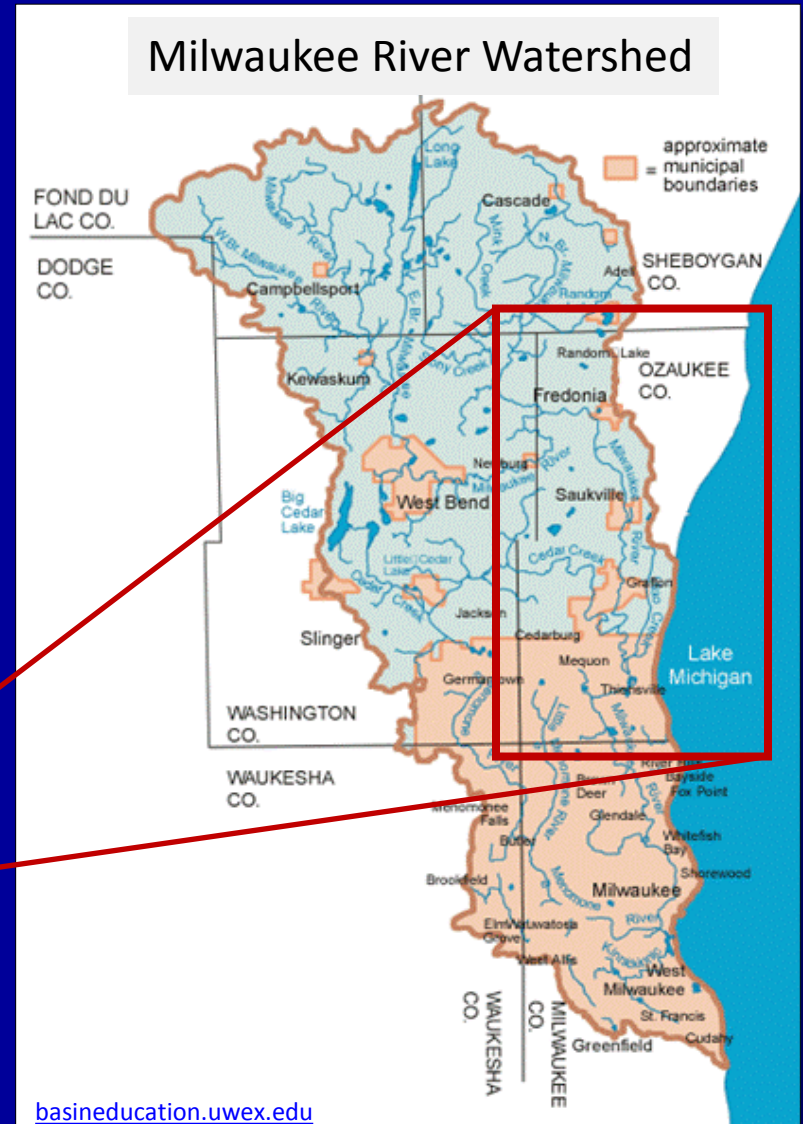
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Ozaukee Fish Passage Program: Making Connections Across Our Watersheds

*Fish Passage 2014 – International Conference on Engineering and
Ecohydrology for Fish Passage
Andrew T. Struck, Director
Ozaukee County Planning and Parks Department*

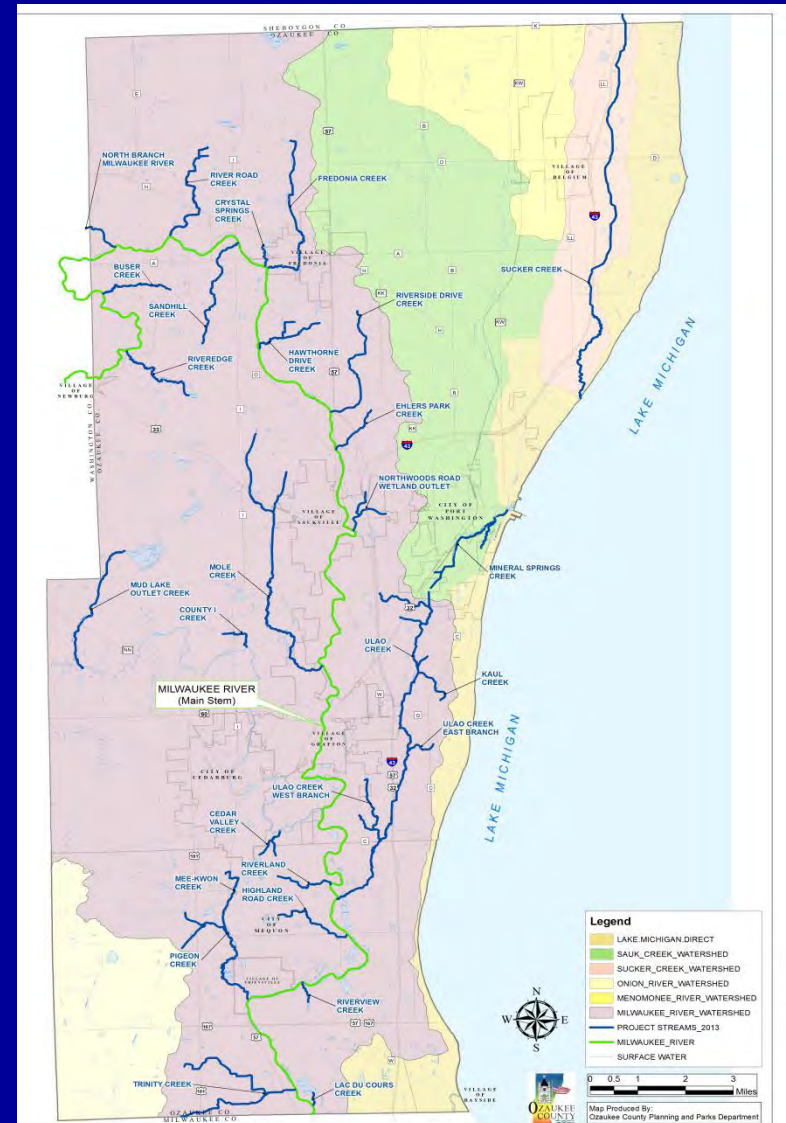


Program Location – Ozaukee County, WI



Ozaukee Fish Passage Program Summary

- \$5.24 Million NOAA/ARRA Grant Awarded (2009 & 2010): Restore Fish Passage in the Milwaukee River Watershed
- \$1.48 Million USEPA GLRI Grant Awarded (2010): Enhancing Ecological Productivity
- \$491,000 USEPA GLRI Grant Awarded (2010): Monitoring to Address 7 of 11 BUIs
- Several federal, state, and private grants (\$1.03 million)
- Program Scope
 - 30 tributaries
 - Four mainstem dams
 - Develop GIS Model for Prioritizing Habitat and Restoration Activities
 - Water Quality Monitoring
 - Sediment Sampling
 - Fisheries Monitoring



Theme – “Making Connections”

Renewing “Old” Connections

- Lake Michigan
- Milwaukee River
- Milwaukee Estuary AOC
- Tributary Streams
- Spawning and Rearing Habitat

Forming “New” Connections With Non-Traditional Stakeholders Through Collaborative Partnerships

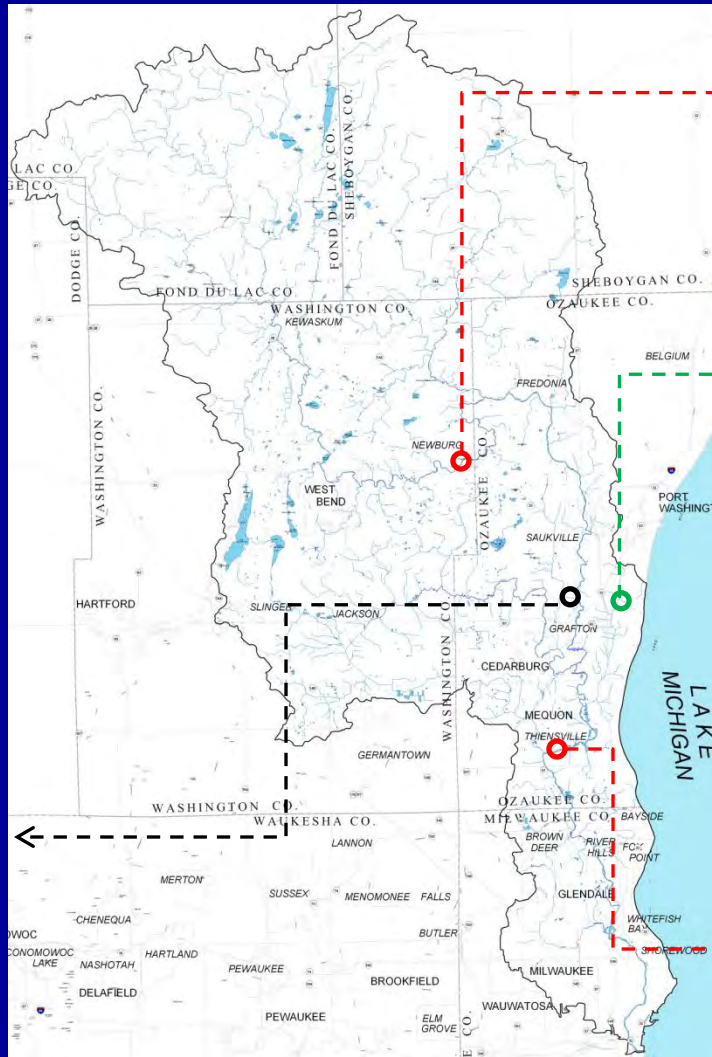


Aquatic Connectivity – Linear and Lateral

- Much of SE Wisconsin's desirable aquatic habitat has been lost or significantly altered
- Quality natural aquatic habitat remain and are protected, but are ecologically isolated
- Re-creating aquatic habitat is expensive and typically inferior
- **Linear** Connectivity
 - Passability within rivers and streams
- **Lateral** Connectivity
 - Connections from rivers and streams to adjacent wetlands, floodplains, and associated habitat



Ozaukee County Fish Passage Case Studies



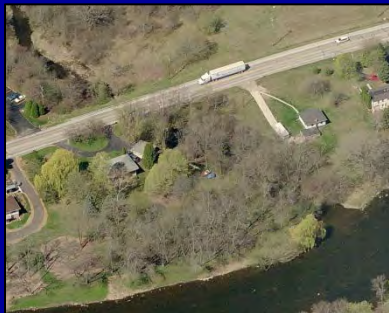
**Newburg Dam
Removal (2012)**



**Ulaio Creek
Habitat
Enhancement
(2013-2014)**



**Mole Creek/CTH O
Culvert Replacement
(2012)**



**Mequon-Thiensville Dam
Passive "Nature-Like"
Fishway (2010)**

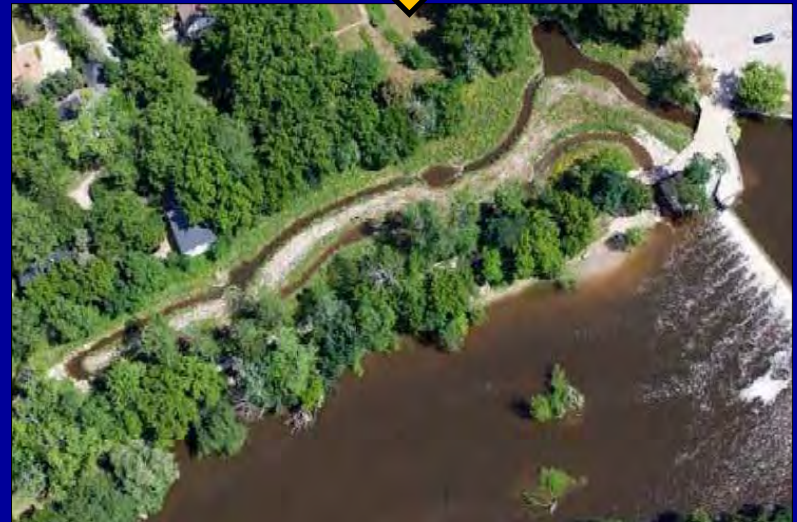


Mequon-Thiensville Dam – Village of Thiensville



Mequon-Thiensville Dam – Village of Thiensville

- Hydraulic height: 6 feet
- Impoundment: 700 acres
- Not a complete barrier to all fish in all conditions
- Miles isolated: 10 mainstem miles
- Dam repair or removal order
- North (L) bank: Abandoned raceway and Village of Thiensville Park/boat launch
- South (R) bank: Private homes
- Impoundment: Very popular for recreation
- Sediment: Documented PCB contamination



Mequon-Thiensville Dam – Fishway Construction



One of eight rock weirs that allow fish to move through the fishway elevation change



Submerged logs, placed during construction to provide overhead cover



The fishway exit, providing fish access to the Milwaukee River upstream of the dam



Underwater Camera



Pools above each rock weir, allowing fish to rest and continue swimming upstream



The fishway entrance and first rock weir, located beneath the pedestrian bridge



The Mequon-Thiensville Dam, no longer an impediment to native fish passage

Mequon-Thiensville Fishway Camera

- Underwater camera and PIT tag readers
- Since June of 2011:
 - Thousands of fish
 - 36 species
 - 35 PIT-tagged fish
 - Other wildlife (e.g. beaver, otter, etc.)
- Streaming live at www.ozaukeefishway.org



www.ozaukeefishway.org 2012-04-20 15:57:55



Mequon-Thiensville Dam & Fishway Summary

- Water Quality:
 - Low DO, High Nutrients, High Temps
- Sediment Transport
 - Limited transport, contaminants found in impoundment
- Aquatic Connectivity/Habitat
 - Improved passage for most species, impoundment habitat degraded
- Aquatic Invasives
 - Dam not full impediment, can monitor & close fishway if necessary
- Infrastructure/Cost
 - Total approximate costs: \$1,047,566
 - Ongoing fishway and dam maintenance, liability
- Recreation
 - Some boating, portage & safety issues, some fishing in impoundment

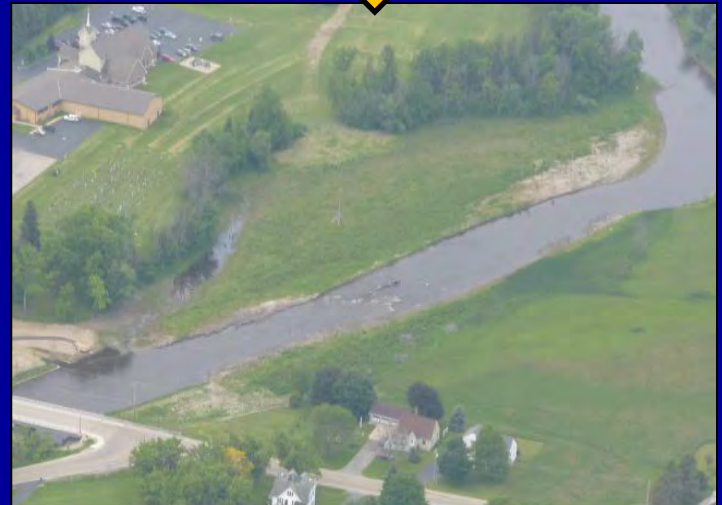


Newburg Dam – Village of Newburg



Newburg Dam – Village of Newburg

- Hydraulic height: 5 feet
- Impoundment: 7 acres
- Not a complete barrier to all fish in all conditions
- Miles isolated: 13 mainstem miles
- Dam repair or removal order
- South (L) bank: Village park
- North (R) bank: Residential development
- Impoundment: Minimal recreation and fishing
- Sediment: Low-level cadmium contamination



Newburg Dam Removal and Restoration



Newburg Dam Removal and Restoration



Newburg Dam Removal

- Water Quality:
 - Improved DO, Low Nutrients, Low Temps
- Sediment Transport
 - Improved, contaminants found & removed from impoundment
- Aquatic Connectivity/Habitat
 - Improved passage & habitat for most species
- Aquatic Invasives
 - Dam was not a full impediment
- Infrastructure/Cost
 - Total approximate costs: \$714,489
 - No ongoing liability or maintenance costs
- Recreation
 - Canoeing/Kayaking, improved fishing for all species



Milwaukee River Mainstem Miles Reconnected

Lake Michigan to Mequon-Thiensville Fishway 20 miles

Mequon-Thiensville Fishway to Lime Kiln Dam 10 miles

Lime Kiln Dam to Bridge Street Dam 2 miles

32 miles

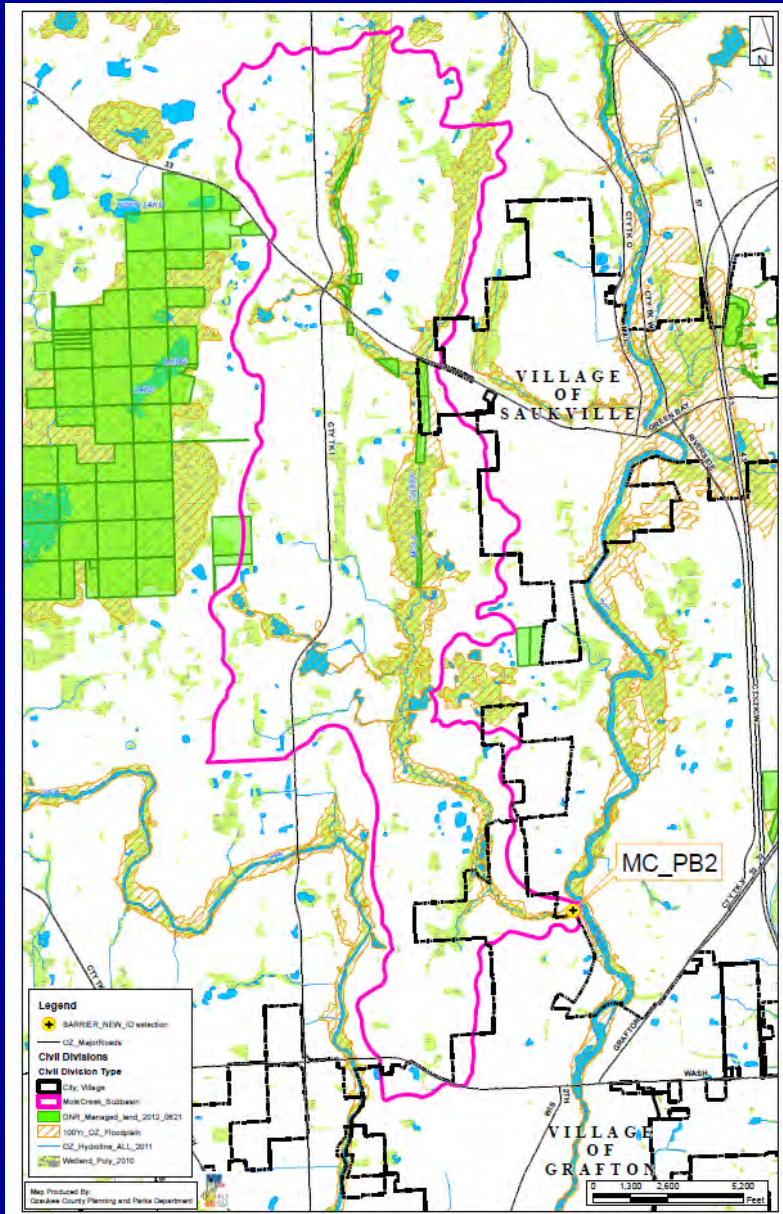
Bridge Street Dam to Newburg Dam 24.5 miles

Newburg Dam to Barton Dam (West Bend) 13 miles

37.5 miles



Mole Creek Watershed



- Ozaukee County's Only Cool/Cold Water Stream
- 5,682 Acres (8.9 sq miles)
- 16.1 Main Stem and Tributary Miles
- 771 Acres of 100-yr Floodplain
- 810 Acres of Connected Wetlands

Mole Creek – County Highway O

- Single 10' x 98' aluminum CMP
 - Constriction – velocity barrier
 - Settled and damaged – raised inlet/upstream pond
- Outlet perched above streambed – barrier for most fish in most conditions
- Isolates nearly all of the Mole Creek Watershed
 - Only documented cold/coolwater stream in County
- County Highway – High traffic volume
- Bottomless 24' aluminum arch
- Extensive utility conflicts/coordination
- Cross-vane and rock bands



Ozaukee County Tributary Miles Reconnected

Buser Creek	0.06 miles	Mud Lake Outlet	2.25 miles
County I Creek	0.17 miles	N. Branch Milwaukee River	1.01 miles
Crystal Springs Creek	0.23 miles	Northwoods Road Creek	0.22 miles
E. Branch Ulao Creek	0.03 miles	Pigeon Creek	4.03 miles
Ehlers Creek	0.79 miles	River Road Creek	0.24 miles
Fredonia Creek	3.96 miles	Riveredge Creek	2.60 miles
Hawthorne Drive Creek	1.46 miles	Riverside Drive Creek	3.60 miles
Highland Road Creek	1.64 miles	Riverview Creek	0.06 miles
Lac Du Cours Creek	0.71 miles	Sandhill Creek	2.26 miles
Mee-Kwon Creek	0.19 miles	Trinity Creek	6.73 miles
Mineral Springs Creek	0.51 miles	Ulao Creek	7.55 miles
Mole Creek	14.71 miles	W. Branch Ulao Creek	0.14 miles

55.15 miles



GIS-Based Fish and Wildlife Decision Support Tool

- Program staff and partners are developing and refining GIS Tools to:
 - Identify native fish and wildlife Species of Local Conservation Interest (SLCI)
 - Identify critical habitats important to ensuring the survival of native fish and wildlife, especially SLCI's
 - Guide habitat enhancement projects for maximum economic and ecological value

Ozaukee County Planning & Parks Department FISH PASSAGE PROGRAM

Coastal Fish and Wildlife Habitat Protection and Planning

Existing and Potential Wildlife Habitat

Existing Wildlife Habitat

- Surface Water
- Forest
- Wooded Swamps
- Grassland/Marsh

Potential Habitat

- PRWs
- Rehabilitation Wetlands

Watershed Boundary

Existing and Potentially Restorable Wetlands

Overall Process

Select watershed and project area Determine Data (Shapefile, GIS, Aerial, County, Census) ID Potentially Restorable Wetlands Field or Wetland Habitat Data Water Quality and Hydrology Data Apply Models for Decision making	Maximizing Habitat Quality Select Fish and Wildlife Species Populate Matrix Apply Priority at Park Scale Test the model Develop Habitat Quality Index (HQI) Apply Model for Decision making
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• Improve wetland restoration decision making with spatial assessment tools
 • Provide a means to assess and maximize wildlife value for wetland and upland habitat restorations

UMBRELLA SPECIES FISHERIES

Northern Pike

Surgeon

Walleye

COMBINING ASSOCIATION RESULTS

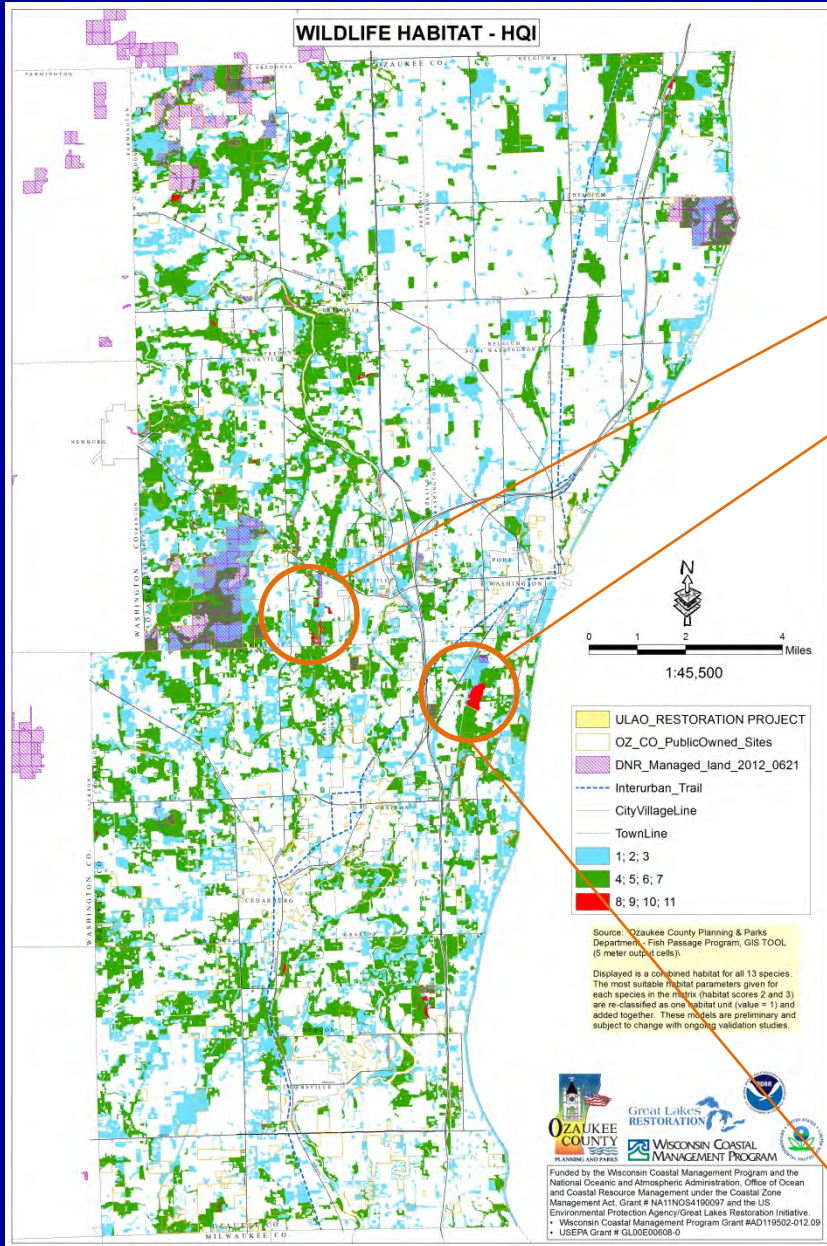
Habitat Quality Index (HQI) = sum of all scores for each grid cell

WILDLIFE HABITAT QUALITY INDEX

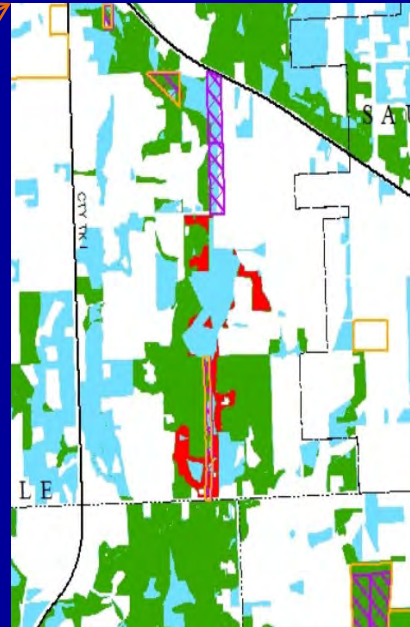
WILDLIFE HABITAT

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GIS-Based Fish and Wildlife Decision Support Tool



Mole Creek Habitat Enhancement Project

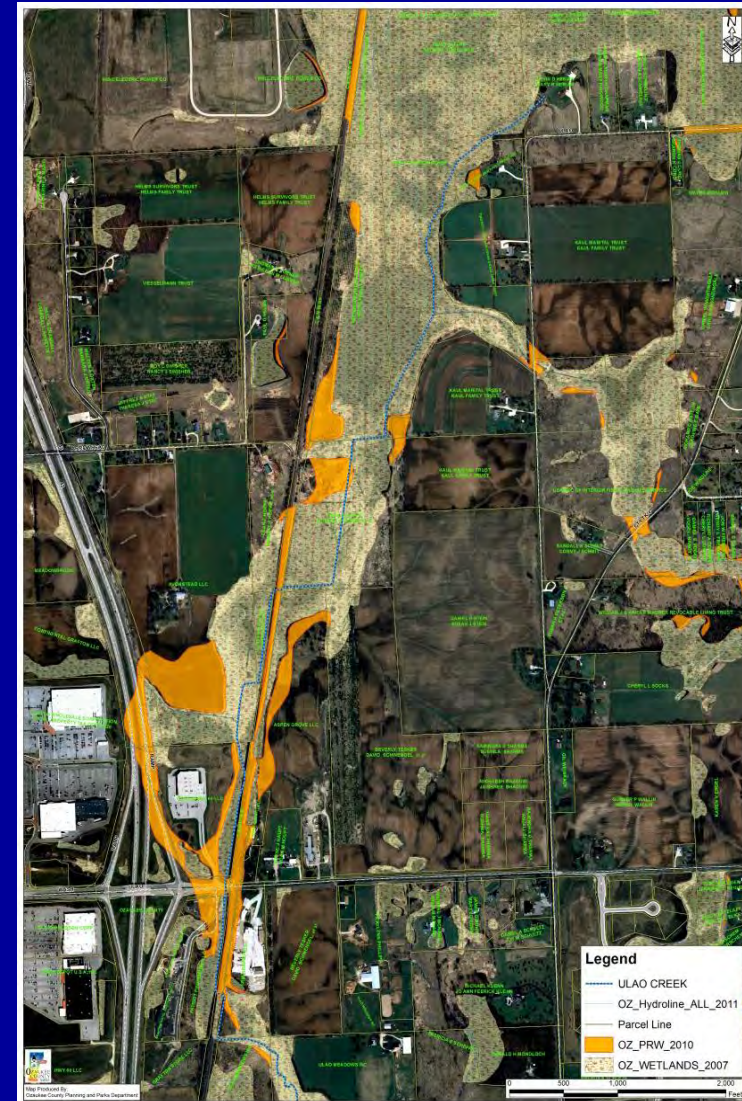


Ulaio Creek Habitat Enhancement Project



Ulao Creek Habitat Improvement/Restoration

- Ulao Creek watershed contains 28% of suitable wetlands for northern pike spawning in Milwaukee River Watershed
- Multiple ephemeral and intermittent tributaries
- Connects 490 acre Ulao Swamp and USFWS Waterfowl Protection Areas to the Milwaukee River
- Swamp designed a Natural Area of Local Significance (SEWRPC)
- Anecdotal and landowner evidence of historic northern pike spawning
- Known birding stopover site



Ulao & Mole Creek Current Conditions

- Channelized reaches (artificially straightened for agricultural uses) provide poor habitat
- Linear sinuosity
- In-stream features are excessively wide and are exclusively shallow runs with maximum water depth
- Overwinter pool cover and spawning quality riffles are absent and substrate is dominated by fine materials
- Canopy shade almost absent
- Channel is incised and hydrologically disconnected from floodplain
- Lack of recurring overbank flows prohibit floodplain building and the former wetland corridor lacks suitable overbank flood flows to sustain a diverse wetland plant and wildlife community



Hydrologic connection



Hydrologic disconnection

Photo Credits: Will Wawrzyn, WDNR

Making Connections Across Our Watersheds



Habitat Enhancement – Mole and Ulao

- **Mole/Ulao Creek Project Goal**
 - Rehabilitate the function and values associated with a cold and/or warm stream ecosystem and floodplain wetlands
- **Mole/Ulao Creek Project Objectives**
 - Excavate a stable meandering stream plan form
 - Increase stream length and sinuosity
 - Decrease mean stream width, and increase water depths and stream velocities
 - Increase in-stream and bank cover for fish and wildlife
 - Rehabilitate acres of wet deciduous forest and wet meadow
 - Increase duration of suitable hydro-period for northern pike spawning
 - Increase topographic diversity to improve canopy shading - planting deciduous trees and expanding shrub-carr areas
 - Creation of additional habitat for birds, herps, and other wildlife
 - Increase the amount of pool and deep glide and construct coarse substrate riffles for lithophilic spawning fish and macroinvertebrates



Ulao Creek Habitat Improvement/Restoration

Ulao Creek Habitat Restoration Project

"Making Connections Across Our Watersheds"



www.co.ozaukee.wi.us/planningparks
www.ozaukee-fishpassage.org

In Partnership With



The Ozaukee County Planning and Parks Department Fish Passage Program restores natural stream functions to reconnect and enhance high quality habitat for native fish, birds and wildlife.



Major Program Successes

- Newburg Dam Removal
- Lime Kiln Dam Removal
- M-T Dam Fishway Construction
- Bridge Street Fishway Engineering, Design, and Policy Introspection
- 54 Road/Stream Crossing Reconstructions
- 176 Small-Scale Impediment Removals
- Reconnection of 129 Stream Miles
- Wetland and Floodplain Habitat Restoration
- 340+ Volunteers = 3,000 Volunteer Hours
- Over 58,000 Labor Hours Created
- Over \$1.75 Million Invested in Ozaukee County Infrastructure Improvements
- Education and Outreach to 7,700 Attendees
- Agreements with 80 Private Landowners
- National Awards and Recognition
- Ongoing Social Media Outreach



Ozaukee County Staff Acknowledgements

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Fish Passage Program Partners & Funders

- National Oceanic and Atmospheric Administration
- US Environmental Protection Agency Office of the Great Lakes
- WI Department of Natural Resources
- Milwaukee Community Service Corps
- US Geological Survey - Conte Anadromous Fish Laboratory
- US Fish and Wildlife Service
- Southeast Wisconsin Chapter of Trout Unlimited
- Ulao Creek Partnership
- Riveredge Nature Center
- Mequon Nature Preserve
- Concordia University
- Marquette University
- University of Wisconsin-Milwaukee Field Station
- University of Wisconsin-Milwaukee
- University of Wisconsin-Stevens Point
- University of Wisconsin Extension Service
- University of Notre Dame
- Milwaukee Area Technical College
- Southeastern Wisconsin Regional Planning Commission
- Great Lakes Sportfisherman Club
- Milwaukee Riverkeeper
- Ozaukee County Tourism Council
- Milwaukee Audubon Society
- Community High Schools
- River Revitalization Foundation
- Treasures of Oz
- Urban Ecology Center
- Ozaukee Washington Land Trust
- Ozaukee County Land Conservation Partnership
- Ozaukee County (multiple departments)
- Ozaukee County Volunteer Center
- Ozaukee County Master Gardeners
- City of Mequon
- Village of Thiensville
- Village of Newburg
- Village of Grafton
- Town of Grafton
- Town of Saukville
- Village of Fredonia
- Town of Fredonia
- Town of Cedarburg



~Making Connections Across Our Watersheds~



QUESTIONS?

